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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/921,680	08/03/2001	Bradford A. Ritter	10015870-1	8311

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EXAMINER

NGUYEN, KIMBINH T

ART UNIT	PAPER NUMBER
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2671

DATE MAILED: 08/04/2004

8

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/921,680

**Applicant(s)**

RITTER, BRADFORD A.

**Examiner**

Kimbhinh T. Nguyen

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 32 and 33 is/are allowed.
- 6) ☒ Claim(s) 1-20, 24-26 and 28-31 is/are rejected.
- 7) ☒ Claim(s) 21-23 and 27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

1. This action is responsive to amendment filed 5/18/04.
2. Claims 1-33 are pending in the application.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-5, 8-12, 14, 15, 29-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Wolters (6,583,790).

**Claim 1,**Wolters discloses representing 3D graphical image as a plurality of graphics primitives (polygon 22 of fig. 2) each having a plurality of vertices (vertices T1, T2 and T3; col. 4, line 65 through col. 5, line 3); for each primitive (polygon 22), computing at least two texture coordinate gradient vectors (Du and Dv; col. 3, line 66 through col. 4, line 5); determining a 3D coordinate frame, wherein using at least two texture coordinate gradient vectors (Du and Dv) computed for the respective graphics primitive for orienting the 3D coordinate frame; and utilizing at least 3D coordinate frame to determine parameters of a parametric texture mapping function (a normalized 3D direction vector in the

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texture coordinate system of the parametric map; col. 5, line 49 through col. 6, line 11).

**Claim 2**, Wolters discloses evaluating the parametric texture mapping function for rendering 3D graphical image (col. 4, line 65 through col. 5, line 6).

**Claim 3**, Wolters discloses parametric texture mapping function comprises a biquadric polynomial (equation 2; col. 3, lines 65) having at least six coefficients ( $A_1$ ,  $A_2$ ,  $A_3$ ,  $A_4$ ,  $A_5$ ,  $A_6$ ; col. 3, lines 60-65).

**Claims 4 and 5**, Wolters discloses calculating scalar components for the parametric texture mapping function (col. 6, lines 26-67); scalar components include lighting scalar components (evaluation of lighting equations; col. 6, lines 58-61).

**Claims 8-10**, Wolters discloses computing a first texture coordinate gradient vector that identifies the direction of maximum change along a first texture coordinate ( $u$  texel coordinate); and computing a second texture coordinate gradient vector that identifies the direction of maximum change along a second texture coordinate ( $v$  texel coordinate); assigning a computed value to a variable; and utilizing variable in computing each of at least two texture coordinate gradient vectors ( $D_u$  and  $D_v$ ); using variable as a denominator in calculating linear combination variables that are used in further computing at least two texture coordinate gradient vectors (col. 7, line 1 through col. 8, line 26).

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**Claim 11**, Wolters teaches parametric texture mapping function is a luminance parametric texture mapping function (illumination model: a diffuse contribution, a specular contribution; col. 4, lines 41-64; fig. 4, #82 and #84).

**Claim 12**, Wolters parametric texture mapping function is a red-green-blue (RGB) parametric texture mapping function (col. 4, lines 41-64).

**Claim 14**, Wolters teaches representing 3D object as a plurality of graphics primitives (polygon 22, fig. 2); determining a first vector from a first vertex of a graphics primitive to a second vertex of graphics primitive; determining a second vector from the first vertex to a third vertex of the graphics primitive (determine direction vectors at vertices of polygon; col. 5, lines 54-62, fig. 3); calculating a first dot product of the first vector by the first vector; calculating a second dot product of the first vector and the second vector (a dot product of each sampled normal with an arbitrary unit vector to from the polynomials; col. 8, lines 57-60); assigning one variable a value derived from at least the first dot product and the second dot product (col. 8, lines 62-64); computing at least two texture coordinate gradient vectors utilizing at least one variable ( $D_u$ ,  $D_v$ ), wherein at least two texture coordinate gradient vectors are indicative of orientation of a texture mapped to graphics primitive; determining a 3D coordinate frame for each vertex of graphics primitive, wherein determining comprises using at least two texture coordinate gradient vectors for orienting 3D coordinate frame ( $D_u$  and  $D_v$ ); and utilizing at least 3D coordinate frame in mapping the texture to 3D object (a normalized 3D direction vector in the texture coordinate system of the parametric map; col. 5, line 49 through col. 6, line 11).

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**Claim 15**, Wolters teaches mapping texture to 3D object comprises utilizing a parametric texture map function (col. 3, lines 53-59).

**Claim 28**, the rationale provided in the rejection of claim 1 is incorporated herein. In addition, Wolters teaches parameters of a parametric texture map includes a biquadric function (col. 6, lines 50-64).

**Claim 29-31**, Wolters teaches view vector  $V_u$ ,  $V_v$ , light vector  $L_u$ ,  $L_v$  and half-angle vector  $H_u$ ,  $H_v$  (col. 5, lines 12-22).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 6, 7, 13, 15-20, 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolters (6,583,790) in view of Peercy et al. (6,163,319).

**Claims 6 and 7**, Wolters does not teach binormal vector; however, Peercy et al. discloses 3D coordinate frame is formed by a normal vector, tangent vector, and binormal vector (col. 3, lines 15-19; col. 9, lines 47-56); calculating a first lighting scalar component for parametric texture mapping function as the dot product of a light vector and the tangent vector; and calculating a second lighting scalar component for the parametric texture mapping function as the dot product of the light vector and binormal vector (col. 4, lines 25-36; col. 26, lines 32-43). It would have been obvious to one of ordinary skill in the art at the time the

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invention was made to incorporate the 3D coordinate frame is formed by a normal vector, tangent vector, and binormal vector taught by Peercy into the parametric texture map of Wolters for forming 3D coordinate frame, because it would perform vector operations between one or more tangent space shading vectors (abstract). Further, **Claim 13**, Peercy et al. also teaches graphics primitive comprises a polygon (col. 14, lines 63-65).

**Claims 15-20**, the rationale provided in the rejection of claims 1, 6, 7, 9 and 10 is incorporated herein. In addition, Peercy et al. teaches a computer system (col. 9, lines 20-35); computer software code stored to computer-readable media (RAM, secondary memory, a hard disk drive, a removable storage unit, computer usable storage medium having stored therein computer software and data; col. 19, lines 54-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate computer usable storage medium having stored therein computer software and data taught by Peercy into the parametric texture maps of Wolters for performing rendering, because it would provide a computer program product for shading an object surface (col. 3, lines 12-13).

**Claims 24 and 25**, the rationale provided in the rejections of claims 1, 6 and 8 are incorporated herein.

**Claim 26**, Wolters teaches the u texture coordinate is orthogonal to the v texture coordinate (col. 5, lines 3-6; fig. 2).

***Allowable Subject Matter***

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7. Claims 21-23, 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not teach the parametric texture map function of the claimed functions.

8. Claims 32 and 33 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not teach compute denom, compute Ps, compute qs, compute pt, compute qt as claimed in claim 32.

### ***Response to Arguments***

9. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

The rejections of claims have been modified in this office action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimbinh T. Nguyen whose telephone number is (703) 305-9683. The examiner can normally be reached on Monday to Thursday from 7:00 AM to 4:30 PM. The examiner can also be reached on alternate Friday from 7:00 AM to 3:30 PM.

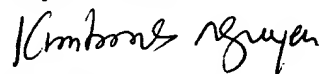


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

July 27, 2004

  
Kimbinh Nguyen

Patent examiner AU 2671